START

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ENGINEERING CHANGE NOTICE

Page 1 of 2

1. ECN 170001

Proj. ECN

2. ECN Category (mark one)	3. Originator's Name, Organization, MSIN, and Telephone No.	4. Date
Supplemental [ ] Direct Revision [X] Change ECN [ ] Temporary [ ] Supersedure [ ] Discovery [ ] Cancel/Void [ ]	R.E. Bolls, Env. Eng. and SARS, N3-13,6-4350	4/28/92
	5. Project Title/No./Work Order No. T-Plant Facility 216-T-1 Laboratory Wastewater Streams Sampling & Analysis Plan	6. Bldg./Sys./Fac. No.
		7. Impact Level 1EQ
	8. Document Number Affected (include rev. and sheet no.) WHC-SD-WM-PLN-036 Rev. 0	9. Related ECN No(s).
		10. Related PO No.

11a. Modification Work	11b. Work Package Doc. No.	11c. Complete Installation Work	11d. Complete Restoration (Temp. ECN only)
[ ] Yes (fill out Blk. 11b) [X] No (NA Blks. 11b, 11c, 11d)		N/A Cog. Engineer Signature & Date	N/A Cog. Engineer Signature & Date

12. Description of Change

Major Changes include:

- Further clarification to Rationale for Sampling Objective Section (2.3)
- Further clarification to Figure 3-2 "Flow Paths for Contributors to the 216-T-1 Ditch"

1234567891011121314151617181920212223242526272829303031 JUN 1992 RECEIVED EDMC

13a. Justification (mark one)	13b. Justification Details
Criteria Change [X] Design Improvement [ ] Environmental [ ] As-Found [ ] Facilitate Const. [ ] Const. Error/Omission [ ] Design Error/Omission [ ]	Revision of this document is needed to reflect recent comments received from the DOE-Permitting organization

14. Distribution (include name, MSIN, and no. of copies)	RELEASE STAMP
SEE DISTRIBUTION LIST	OFFICIAL RELEASE BY WHC 23 DATE APR 29 1992 Sta #10

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ENGINEERING CHANGE NOTICE

1. ECN (use no. from pg. 1): 170001

15. Design Verification Required	16. Cost Impact — ENGINEERING		16. Cost Impact — CONSTRUCTION		17. Schedule Impact (days)	
☐ Yes	Additional ☐	$	Additional ☐	$	Improvement ☐	
☒ No	Savings ☐	$	Savings ☐	$	Delay ☐	

18. Change Impact Review: Indicate the related documents (other than the engineering documents identified on Side 1) that will be affected by the change described in Block 12. Enter the affected document number in Block 19.

SDD/DD	☐	Seismic/Stress Analysis	☐	Tank Calibration Manual	☐
Functional Design Criteria	☐	Stress/Design Report	☐	Health Physics Procedure	☐
Operating Specification	☐	Interface Control Drawing	☐	Spares Multiple Unit Listing	☐
Criticality Specification	☐	Calibration Procedure	☐	Test Procedures/Specification	☐
Conceptual Design Report	☐	Installation Procedure	☐	Component Index	☐
Equipment Spec.	☐	Maintenance Procedure	☐	ASME Coded Item	☐
Const. Spec.	☐	Engineering Procedure	☐	Human Factor Consideration	☐
Procurement Spec.	☐	Operating Instruction	☐	Computer Software	☐
Vendor Information	☐	Operating Procedure	☐	Electric Circuit Schedule	☐
OM Manual	☐	Operational Safety Requirement	☐	ICRS Procedure	☐
FSAR/SAR	☐	IEFD Drawing	☐	Process Control Manual/Plan	☐
Safety Equipment List	☐	Cell Arrangement Drawing	☐	Process Flow Chart	☐
Radiation Work Permit	☐	Essential Material Specification	☐	Purchase Requisition	☐
Environmental Impact Statement	☐	Fac. Proc. Samp. Schedule	☐		☐
Environmental Report	☐	Inspection Plan	☐		☐
Environmental Permit	☐	Inventory Adjustment Request	☐		☐

19. Other Affected Documents: (NOTE: Documents listed below will not be revised by this ECN.) Signatures below indicate that the signing organization has been notified of other affected documents listed below.

Document Number/Revision	Document Number/Revision	Document Number/Revision

20. Approvals

OPERATIONS AND ENGINEERING	Signature	Date
Cog./Project Engineer	[signature]	4/28/92
Cog./Project Engr. Mgr.	[signature]	4/28/92
QA	N. Brickm	4/29/92
Safety		
Security		
Proj.Prog./Dept. Mgr.	[signature]	4/29/92
Def. React. Div.		
Chem. Proc. Div.		
Def. Wst. Mgmt. Div		
Adv. React. Dev. Div.		
Proj. Dept.		
Environ. Div.	[signature]	[illegible]
IRM Dept.		
Facility Rep. (Ops)	[signature]	4/29/92
Other		

ARCHITECT-ENGINEER	Signature	Date
PE		
QA		
Safety		
Design		
Other		

DEPARTMENT OF ENERGY

Signature	Date
[signature]	4/29/92
J. S. Rasmussen	4/29/92

ADDITIONAL

SUPPORTING DOCUMENT

1. Total Pages ~~53~~ 55

2. Title
T-Plant Facility 216-T-1 Laboratory Wastewater Stream Sampling and Analysis Plan

3. Number
WHC-SD-WM-PLN-036

4. Rev No.
1

5. Key Words
Sampling, Analysis, QAPP, liquid effluent stream

6. Author
Name: R. E. Bolls

R. E. Bolls 4/28/92
Signature

Organization/Charge Code 87350/A2DK1

7. Abstract

This document presents the revised T-Plant Facility 216-T-1 Laboratory Wastewater Stream Sampling and Analysis Plan (SAP), which has been identified as Tri-Party Agreement (TPA) Milestone M-17-42A. The plan provides a thorough description of the facility, and identifies the responsible organizations for sampling. In addition, the plan identifies the sampling location, frequency, schedule, equipment and procedures, along with the sample analysis and handling processes utilized at T-Plant to obtain a liquid effluent sample from the 216-T-1 stream.

9. Impact Level 1EQ

10. RELEASE STAMP

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Page Ac 1

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T-Plant Facility 216-T-1 Laboratory Wastewater Stream Sampling and Analysis Plan

CHANGE CONTROL RECORD

(3) Revision	(4) Description of Change - Replace, Add, and Delete Pages EDT-124396 REV 0	Authorized for Release (5) Cog. Engr.	(6) Cog. Mgr. Date
RS 1	(7) Incorporate clarification changes to "Rationale for Sampling Objective" Section (2.3) and Figure 3-2 "Flow Paths for Contributors to the 216-T-1 Ditch" per ECN 170001	R. E. Bolls	R. D. Pierce 4/29/92

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A-7320-005 (08/91) (EF) WEF168

T-PLANT FACILITY 216-T-1 LABORATORY WASTEWATER STREAM SAMPLING AND ANALYSIS PLAN

April 29, 1992

Prepared For:

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WHC Contract No. MLW-SVV-073750
Task Order S-92-15

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T-PLANT FACILITY 216-T-1 LABORATORY WASTEWATER STREAM SAMPLING AND ANALYSIS PLAN

1.0 INTRODUCTION

This report is the second sampling and analysis plan (SAP) prepared for liquid effluents discharged from operations at the T-Plant Facility. The first SAP prepared covered the 216-T-4 Wastewater Stream, which constitutes the majority of the liquid effluents from the facility. This SAP covers the 216-T-1 Laboratory Wastewater Stream, which is composed entirely of liquid effluents resulting from operations in the Head-End of the 221-T Building.

Section 13.1.4 of the May 21, 1991 proposed amendments to the Hanford Federal Facility Agreement and Consent Order, known as the Tri-Party Agreement (Ecology et al. 1989), requires that a SAP be prepared for each of the thirty-three liquid effluent streams that are actively discharged at the Hanford Site. One of these streams is the 216-T-1 Laboratory Wastewater Stream discharged to the 216-T-1 Ditch. The SAP for the 216-T-1 Wastewater Stream is presently identified as Tri-Party Agreement Milestone M-17-42A. A SAP is a document that can be amended by agreement among the U. S. Department of Energy (DOE), the Environmental Protection Agency (EPA), and the Washington State Department of Ecology (Ecology). Any amendment to this document can be considered a Tri-Party Agreement Class III change.

A liquid effluent sampling program, which includes the SAP, has been established by Westinghouse Hanford Company (Westinghouse Hanford) to minimize the potential adverse effects on the environment of liquid effluent discharge to a soil column as a result of operations at the Hanford Site. As required by the Tri-Party Agreement Amendments, the sampling program will "provide a representative sampling of wastes discharged to the soil column, accounting for variations in volumes and contaminant concentrations due to operational practices, and considering all of the parameters known or suspected to be associated with each liquid effluent stream, influence of operational practice, raw water characteristics, and process knowledge." In general, a SAP documents the methods and frequency of sampling and the requirements for analysis to determine the constituents of a liquid effluent stream. The SAP includes the sampling methods necessary to meet the requirements for confirmatory measurements of negligible releases.

The sampling and analysis effort includes the collection of samples, their transport to an analytical laboratory, performance of analytical tests, and data reduction. The sampling program also involves quality assurance and quality control practices to ensure data traceability and acceptability. The quality assurance and quality control practices common to the sampling and analysis plans to be prepared for all 33 streams are presented in the Liquid

Effluent Sampling Quality Assurance Project Plan, WHC-SD-WM-QAPP-011, Rev. 0 (Nguyen 1990). The quality assurance project plan (QAPP) describes the means selected to implement the overall QA program requirements. The QAPP is intended to ensure that procedures, plans, and instructions are implemented and appropriate for the control of sampling activities that comply with DOE, EPA, and Ecology requirements.

This SAP has been developed in accordance with the Liquid Effluent Sampling QAPP and program objectives and guidance. This plan provides a method for obtaining a representative sample of the constituents of the T-Plant Facility 216-T-1 Laboratory Wastewater Stream. The method considers the fluctuation of constituent concentration, flow rate, raw water characteristics, and process knowledge. All known or suspected constituents associated with the wastewater stream have been identified. This plan also includes an implementation schedule that addresses the frequency of sampling as well as the Quality Assurance details regarding sample collection, transport, analysis, and data reporting required in the Liquid Effluent Sampling QAPP.

This SAP for the 216-T-1 Laboratory Wastewater Stream supports efforts to characterize and designate the constituents of the liquid. Rationale for designating the Stream is discussed in Section 2.3. The objectives of the sampling program are given in Section 2. Process knowledge and facility descriptions are presented in Section 3; the text along with illustrations and tables that summarize the stream composition and handling methods will give a broad view of the 216-T-1 Laboratory Wastewater Stream sources and disposition. The rest of the report, Sections 4 through 8, specifies the sampling schedules and protocols that make up the sampling program.

2.0 SAMPLING OBJECTIVES

Objectives have been established for the liquid effluent sampling program and specific to the T-Plant Facility 216-T-1 Laboratory Wastewater Stream Sampling and Analysis Plan.

2.1 Liquid Effluent Sampling Program Objectives

Objectives have been established to support the liquid effluent sampling program. The program is designed to minimize the potential adverse effects on the environment of liquid effluent discharge to a soil column as a result of operations at the Hanford Site. The objectives for the program are:

1. Provide data to confirm process knowledge that the stream does not contain dangerous waste as defined in WAC 173-303, "Dangerous Waste Regulations."

2. Provide confirmatory data to support development of wastewater treatment projects.

3. Provide data for input into the WAC 173-240-130, "Engineering Reports," which includes data for All Known Available and Reasonable Treatment (or comparable Best Available Treatment) evaluations and liquid effluent treatment system design.

4. Provide sufficient data on chemical and radiological constituents to accurately calculate loading and rate of migration to support the assessment of impacts of continued discharge.

2.2 Sampling and Analysis Plan Objectives

The sampling objectives for this SAP were based on several guidance documents and program issues. The sampling and analysis plan for the T-Plant Facility 216-T-1 Laboratory Wastewater Stream has been prepared to meet the following objectives:

1. Document the methods and frequency of sampling and the requirements for analysis to determine the constituents of the liquid effluent stream.

2. Provide sufficient data to verify a non-dangerous waste designation for the liquid effluent stream.

3. Provide quality assurance requirements not covered by the QAPP that are specific to the liquid effluent stream.

2.3 Rationale for Sampling Objectives

The 216-T-1 Ditch receives a relatively innocuous liquid discharge. At present, the principal contributor to the wastewater stream is steam condensate and cooling water and storm water drainage. These contributors, which are described in Section 3.2, are expected to contain little or no radioactive and/or hazardous materials. In addition, administrative procedures and engineering barriers have been adopted at the T-Plant Facility to limit the entry of these materials into the 216-T-1 Laboratory Wastewater Stream. A potential for radioactive contamination in the wastestream exists based on process knowledge of the testing programs conducted in the Head-End and the presence of systems and components in (radiologically) Controlled Areas.

A sampling and analysis plan for the 216-T-1 Laboratory Wastewater Stream is required under the Tri-Party Agreement and Consent Order No. DE91-NM-177 (Ecology 1991). The 216-T-1 Laboratory Wastewater Stream is scheduled for inclusion in Project W-049H, which will result in the discontinued use of the 216-T-1 Ditch and cessation of discharge to (ground) soil column by June 1995.

Although the 216-T-1 Laboratory Wastewater Stream is not currently scheduled for permitting under Ecology's WAC 173-216, Project W-049H is scheduled for a WAC 173-216 Discharge Permit application to be submitted by September 1994 (Ecology 1991). Project W-049H is expected to receive the liquid effluent associated with this stream upon completion of the project. The Tri-Party Agreement requires that a groundwater impact assessment be performed for the 216-T-1 Laboratory Wastewater Stream according to the methodology prepared to satisfy Milestone M-17-13. If the assessment supports resumption of disposal to the ground, a WAC 173-216 Discharge Permit would be required. The ultimate disposal option selected will affect the permitting activities and the selection of analytes of interest. Perhaps because of these uncertainties, it is important to clearly state the rationale for this sampling and analysis plan approach including the selection of the analytes of interest.

Section 9 of the Consent Order, "Sampling and Analysis Plans", provides specific guidance on the selection of appropriate analytes of interest. The order states that during SAP preparation, "the contaminant analysis requirements shall consider operational practices, raw water characteristics, process chemical additions, process knowledge, and all known or suspected constituents associated with each wastewater streams." The major objective of the analyses is to provide data to confirm that the liquid effluents currently disposed to the 216-T-1 Ditch do not constitute a dangerous hazardous waste according to the classifications of WAC 173-303, specifically WAC 173-303-140, "Land Disposal Restrictions." In addition, the data will support engineering evaluations of BAT/AKART required under Ecology's WAC 173-240.

Many of the analytes of interest for the stream have been determined based primarily on historical uses of the Head-End, documented process knowledge, and inventories of waste regulated under the Superfund Amendments and Reauthorization Act (SARA). Selection of the analytes of interest is described in detail in Section 8.1 of this report. Although information on the characteristics of the 216-T-1 Laboratory Wastewater Stream are presented in the T-Plant Laboratory Wastewater Stream-Specific Report, WHC-EP-0342 Addendum 32 (Jeppson 1990), the report has not been approved by Ecology or EPA. It is unlikely that the report, which includes a wastewater stream designation, will be approved in the future. For this reason, determination of the analytes of interest and other sampling parameters for the 216-T-1 Laboratory Wastewater Stream have not been based solely on this stream-specific report. It is noteworthy, however, that a positive indication of a contaminant as presented in the stream-specific report was used as justification for the contaminant to be included on the list of analytes of interest.

Additional analytes of interest have been included for analysis for the 216-T-1 Laboratory Wastewater Stream based on a strategy similar to that used to determine a wastewater stream designation for a liquid discharge found in Ecology's Dangerous Waste Regulations, WAC 173-303, and associated referenced regulations by EPA in 40 CFR Parts 264 and 268. EPA's "Ground-Water Monitoring List," 40 CFR Part 264, Appendix IX, produces a lengthy list of constituents that are to be considered when developing a constituent list of analytes of interest for groundwater monitoring. Appendix IX is not meant to provide a mandatory analytical list and wholesale application of the appendix appears to be inappropriate for "end of pipe" monitoring of liquid effluent not regulated under the Resource Conservation Recovery Act (RCRA). Therefore, the comprehensive list of the analytes of interest in Section 8.1 has considered the analytes in Appendix IX, but the final list does not include all of the groundwater monitoring table as outlined in Appendix IX because the applicable regulations do not require that the analyses include the entire Appendix IX list. The screening analyses presented in this SAP are in accordance with the applicable regulations and will be adequate to ensure identification of potential contaminants. Analytes of interest have been selected that have been detected previously, are considered a potential contributor based on process knowledge, is included in a chemical inventory or stored in an area that could drain into the 216-T-1 Laboratory Wastewater Stream, or could provide information for calculation of soil loading or migration.

3.0 SITE BACKGROUND

This section contains descriptions of the portions of the T-Plant Facility that have liquid effluents discharged to the 216-T-1 Laboratory Wastewater Stream. This description includes a discussion of T-Plant buildings, structures and facilities, and physical contributors to the stream. Section 3.1 includes information on past and current activities that impacted discharges to the stream. Section 3.2 provides a detailed description of past and current individual contributors to the stream.

3.1 T-Plant Facility

The T-Plant Facility is located in the 200 West Area of the Hanford Site, which is located in the south-central region of Washington State. The T-Plant Facility is managed for the U.S. Department of Energy (DOE) by the Westinghouse Hanford Company. The facility and ancillary systems (Figure 3-1) serve as the primary decontamination facility for the Hanford Site. At present, liquid effluents associated with the decontamination mission are routed to wastewater streams other than the 216-T-1 Laboratory Wastewater Stream. In the past, liquid effluents routed to the 216-T-1 Laboratory Wastewater Stream, including those from operations in the Head-End of the 221-T Building, were two sets of light-water reactor (LWR) experiments conducted from October 1989 to March 1990. Liquid effluents included cooling water, steam condensate, process solutions, and roof and floor drains associated with these tests.

3.1.1 Buildings, Structures and Ancillary Facilities

The original buildings at T Plant were constructed in the mid-1940s to extract plutonium from production reactor fuel. The plant continued to perform this function until it was deactivated in 1956. Most of its original process equipment was subsequently removed. In 1957, T Plant was placed in service as a beta-gamma decontamination facility and as a support complex for experiments and other operations requiring containment or isolation. It currently functions primarily as a decontamination facility (Hinckley 1985).

The T-Plant Facility consists of two primary decontamination buildings: 221-T and 2706-T. Building 221-T, which was built during 1943 and 1944, provides services in radioactive decontamination, reclamation, and decommissioning of process equipment contaminated with fission products and other highly-contaminated pieces of equipment. The Head-End of the 221-T Building has served as the site of experimental operations and testing. The area includes numerous storage and waste tanks and test vessels. Effluents from the 221-T Building Head-End activities flow 90 m through an underground pipe to the 216-T-1 Ditch. No liquid effluents from the 2706-T Building are discharged to the 216-T-1 Laboratory Wastewater Stream.

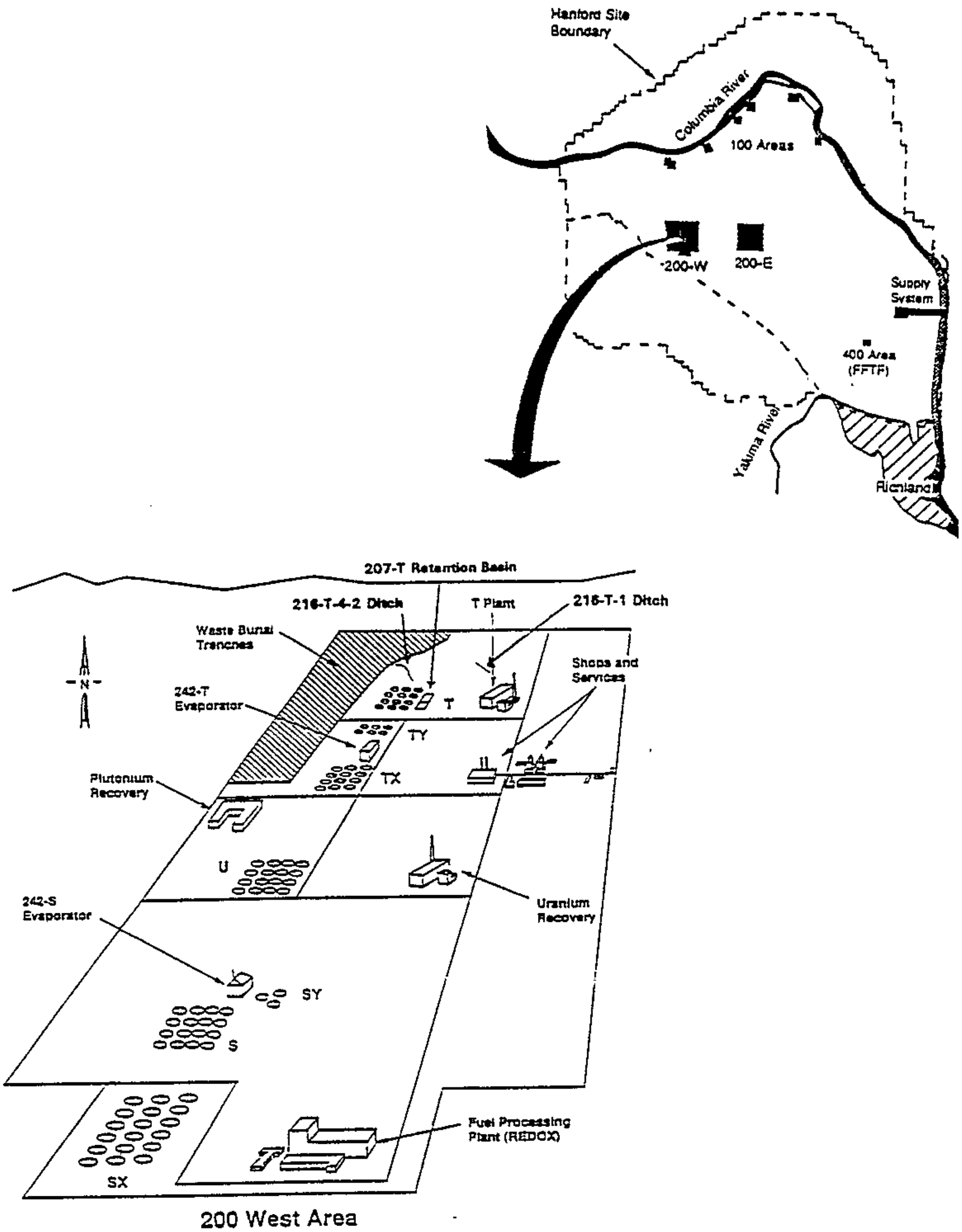

Figure 3-1. Location of T-Plant Buildings and Ancillary Structures in 200 West Area

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The 221-T Building Head-End consists of a canyon area that extends from the basement floor to the roof. The Head-End includes a four-story test vessel and numerous liquid storage and collection tanks for experiments. The Head-End canyon area has several deck levels and a parapet wall. Four floor levels adjacent to the canyon house an electrical switchgear room, a chemistry laboratory, office areas, a change room, a lunch room, a control room, an instrument shop, a maintenance shop, and storage areas.

3.1.2 Head-End Process History

The processes in the Head-End of the 221-T Building have varied during the history of T Plant. Initially the Head-End was used to process spent fuel from production reactors. The wastes discharged to the 216-T-1 Ditch from this process were documented in 1976 in an unpublished Atlantic Richfield Hanford Company (ARHCO) report. These wastes were predominantly cooling water and steam condensate from the spent fuel dissolution process. They were discharged from 1945 (at the start of facility operations) to 1956. When the dissolution equipment was removed from the 221-T Building Head-End in 1956, efforts were made to remove and/or stabilize the radioactive contamination in the facility. A testing program was then established for testing with iodine and radioactive cesium in a new containment vessel fabricated in place in the old dissolver cells and canyon. This modified facility also was referred to as the Containment System Test Facility (CSTF). This work was started in 1964 and completed in 1969 by the Pacific Northwest Laboratory (PNL). A test was conducted with radioactive cobalt during this time. In 1972, a vacuum fractionator was built and testing began. In 1976, testing was completed and the vacuum fractionator was removed. This work was performed by ARHCO. Between 1976 and 1985, Westinghouse Hanford conducted liquid-metal reactor safety tests in the CSTF with nonradioactive sodium, lithium, and sodium iodide. These tests consisted of sodium and lithium pool reaction, spray reaction, and aerosol behavior tests. Between 1985 and 1990, Westinghouse Hanford conducted LWR tests using nonradioactive cesium, manganese, zinc, lithium sulfate, iodine, and hydrogen iodide. Several related tests were conducted using nonradioactive lithium and lithium-lead alloy in support of the fusion safety program during this same time period. Since March 1990, there have been no tests or operations performed in the Head-End. In general, current activities in the Head-End are associated with cleanup including equipment removal.

3.1.3 Identification and Characterization of Potential Source Terms

The liquid-metal reactor safety tests conducted in the Head-End of the 221-T Building between 1978 and 1985 generated reacted sodium, lithium, and sodium iodide that dissolved in water and discharged to the 216-T-1 Ditch. If radioactive as a result of residual contamination from previous activities, the wastewater was transferred to the 221-T Building, Cell 5, for sampling and pH adjustment, then transferred to tank farm double-shell tanks for waste storage and eventual processing through waste evaporators. Unreacted metals were transferred to the 105-DR Reactor Facility for disposal. The determining conditions for routing the solutions were: the pH of the solution, the need for caustic solution to neutralize decontamination solutions used elsewhere in the 221-T Building, and/or the presence of radioactive material. If radioactive material were detected, the pH were in excess of 12.5, or the caustic solution were needed for neutralization, the procedure allowed for the solution to be transferred to the 221-T Building Head-End. Otherwise, the liquid was discharged to the 216-T-1 Ditch. No solutions accumulated that had a pH of less than 2. Quantities of alkali metals also were discharged to the 216-T-1 Ditch.

Between 1985 and 1990, the LWR tests were conducted using nonradioactive cesium, manganese, zinc, lithium sulfate, iodine, and hydrogen. Several related tests were conducted using nonradioactive lithium and lithium-lead alloy in support of the fusion safety program during this same period. The process wastewater discharged to the 216-T-1 Ditch during these test programs consisted of cooling water, steam condensate, and some of the 221-T Building Head-End waste solutions. Head-End wastewater to the 216-T-1 Ditch was divided into two parts for the purpose of wastewater characterization (Jeppson 1990). These two parts, which together comprised the 216-T-1 Laboratory Wastewater Stream, were designated Wastewater 1 Stream for plasma torch operation and Wastewater 2 Stream for plasma torch standby. The used lithium-lead alloy was packaged after completion of the tests and shipped offsite as solid waste.

The Wastewater 1 Stream time period was defined as the time it took cooling water to flow around the plasma torch tip. This cooling-water flow period was about 24 hours for each of two sets of experiments conducted during the 6-month designation period. The plasma torch was operated to generate manganese aerosol in the aerosol-mixing vessel. The torch generated aerosol for about 1 h for each set of experiments conducted. Other cooling water and steam condensate flows contributed to the Wastewater 1 Stream.

No process chemicals were discharged intentionally in the Wastewater 1 Stream with the plasma torch operating; however, some process chemicals were discharged accidentally. The liquid volume discharge for Wastewater 1 Stream was about 250 ℓ/min or a total of 11×10^6 ℓ for tests conducted between 1985 and 1990. The Wastewater 1 Stream flows were estimated to extend for one to two days for each set of LWR tests. The process concentration of constituents was expected to be the same as those for sanitary water because the Wastewater 1 Stream was composed primarily of cooling water with some steam condensate. Variability of the Wastewater 1 Stream was considered very minor.

The Wastewater 2 Stream consisted of process cooling water and steam condensate flows for the time period when there was no cooling-water flow to the plasma torch. Process wash solutions were also discharged on a batch basis as part of the Wastewater 2 Stream. The Wastewater 2 Stream duration consisted of the 6-month designation time period minus the 48 hours for plasma torch cooling water flow (Wastewater 1 Stream).

The total process chemicals discharged as Wastewater 2 Stream from the Head-End for disposal in the 216-T-1 Ditch between 1985 and 1990 were cesium (33.5 kg), manganese (less than 24.0 kg), iodine (3.6 kg), potassium (7.0 kg), zinc (less than 18.5 kg), lithium (47.0 kg), sulfate (325.0 kg), phosphate (33.6 kg), sodium (120.0 kg), borate (124 kg), and ethylenediaminetetraacetic acetate (600.0 kg). The Wastewater 2 Stream consists mainly of the heating-and-ventilation cooling water flow with some steam condensate and process solution flow. Between December 1985 and March 1990, the total Wastewater 2 Stream volume was estimated to be an average of about 20 ℓ/min for a total of 5.4 x 10^7 ℓ. This process evaluation resulted in an average concentration of cesium (620 parts per billion [ppb]), manganese (33 ppb), iodine (67 ppb), potassium (130 ppb), zinc (19 ppb), sodium (2.2 ppm), borate (2.3 ppm), and ethylenediaminetetraacetic acetate (11.1 ppm). Variability of the Wastewater 2 Stream concentrations of process chemicals has been significant in the past. The solutions containing the process chemicals were pumped within one hour to the stream on a batch basis. The process batches accumulated and were discharged after each test. An average of one test every two months was typical. No process solution batches were identified for discharge to Wastewater 2 Stream after fiscal year (FY) 1990.

Recent test activities include two sets of LWR experiments that were conducted from October 1989 through March 1990. Cooling water, steam condensate, process solutions, and roof and floor wastewater drains associated with these tests and the building operating functions were discharged to the 216-T-1 Ditch during these 6 months.

No testing or operations have been conducted in the 221-T Building Head-End since March 1990. The 221-T Building Head-End may continue to be used for office space, and the heating and ventilation systems are expected to remain in operation. Steam condensate and cooling water associated with the building heating and air conditioning, along with floor wash water, are the only regular liquid effluents expected to be generated and discharged to the 216-T-1 Ditch. There is no intention to discard chemical inventory to the wastewater stream for disposal. Any future test or equipment-washing solutions will be evaluated using process information and chemical analyses. The decision to discharge solution to the 216-T-1 Ditch or ship the solution to hazardous waste disposal will be made based upon the results of these analyses.

3.1.4 216-T-1 Ditch

The 216-T-1 Laboratory Wastewater Stream, which is commonly referred to as the Head-End process laboratory wastewater or process sewer flow, discharges to the 216-T-1 Ditch. The 216-T-1 Ditch is labeled on a concrete marker as the "216-T-1 Crib" and is located north of the 221-T Building Head-End (NE end). Contributors to the 216-T-1 Laboratory Wastewater Stream discharge into a common wastewater pipe. This wastewater pipe extends underground approximately 90 m from the building to the discharge point outfall into the 216-T-1 Ditch. The ditch is approximately 1,000 ft long, 30 ft wide at the top and 6 ft wide at the bottom. Average depth of the ditch is 4 ft. The side slope is 1:1.5. The ditch was dug in May 1972. At present, the ditch is overgrown with grasses and small plants or shrubs. Disposal of effluents in the 216-T-1 Ditch is by evaporation and absorption into the soil.

The future content of liquid effluents that would be discharged to the 216-T-1 Ditch is uncertain. As documented previously, the nature of the experiments in the 221-T Building Head-End determines the constituents of the waste stream. Currently, there are no effluent monitors for flowrate or constituents for this effluent stream since there are no experimental activities conducted there. In the past, process batch solutions from experimental operations in the Head-End were collected in holding tanks and sampled for pH. If they met discharge criteria, they were discharged into the 216-T-1 Ditch. As previously stated, no new discharges are planned for the 216-T-1 Ditch. If future activities result in effluents to the 216-T-1 Ditch, a review of monitoring requirements would be required.

3.2 Contributors to the 216-T-1 Laboratory Wastewater Stream

Specific contributors to the 216-T-1 Laboratory Wastewater Stream can be grouped according to the 8 process sewer lines from the 221-T Building Head-End that connect to the 6-in.-diameter main header for discharge to the 216-T-1 Ditch. These process sewer lines are from the 1) upper floor sumps, 2) heating and ventilation system, 3) basement laboratory sump, 4) welder cooling water, 5) first floor aerosol sampling water, 6) waste Tank TK-1, 7) process cell sump, and 8) control room floor drains. Figure 3-2 demonstrates the flow of the individual contributors to each of the process sewer lines and indicates those contributors that are considered routine and potential. Based on previous operations in and the current configuration of the 221-T Building Head-End, there are 39 contributors of liquid effluent to the 8 process sewer lines. Of the identified contributors, 7 contribute routinely, 8 are potential contributors, and the remainder are considered inactive. Three process water flows, three steam condensate flows, and flow from the roof drain are the routine contributors. The three process water flows are the second floor cooling water, third floor cooling water, and third floor compressed air condensate. Potential contributors include flows from five floor or safety shower drains, two sinks, and one large wash pad. This SAP for the 216-T-1 Laboratory Wastewater Stream is based principally on previous operations. These operations ceased in March 1990. Future liquid effluent discharges will be evaluated based upon process information and chemical analyses. The decision to discharge to the 216-T-1 Ditch or ship the solutions to hazardous waste disposal sites will be made based upon the results of these analyses.

Table 3-1 provides information on contributor status, potential contaminants, and stream handling for the four process sewer lines that have routine or potential contributors to the 216-T-1 Laboratory Wastewater Stream. These four process sewer lines are the 1) upper

9 3 1 2 7 5 3 0 1 3 0

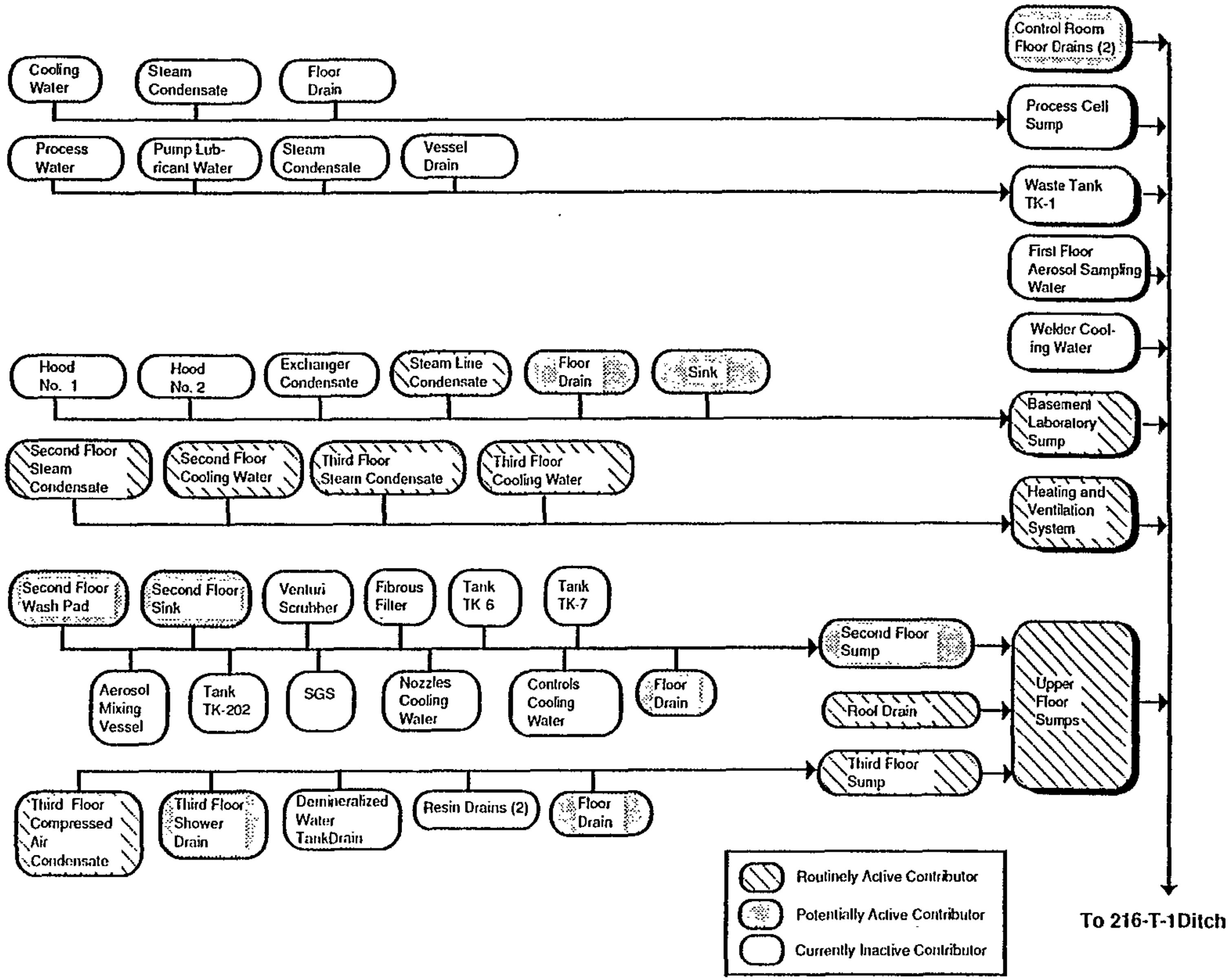

Figure 3-2. Flow Paths for Contributors to the 216-T-1 Ditch

floor sumps, 2) heating and ventilation system, 3) basement laboratory sump, and 4) control room floor drains. The other four process sewer lines previously identified have no contributors that are considered routine or potential contributors. Individual contributors are identified for each process sewer line. The remaining four process sewer lines were not included because the individual contributors are inactive. Table 3-1 also identifies the contributor status (routine or potential) and the potential contaminants (hazardous, radioactive, or none). The Stream Handling/Rate of Discharge column describes the flow path of each individual contributor, flow rate estimates for each sewer process line, and the composition of the source (raw or sanitary water). There are no effluent monitors that measure flow rate or constituents for any of these wastestreams. The information provided in Table 3-1 is an estimate based primarily on process knowledge. The following sections provide specific information on each of the process sewer lines.

3.2.1 Upper Floor Sumps

Liquid from three areas contributes to the process sewer line identified as the upper floor sumps. These three areas are the 1) second floor sump, 2) third floor sump, and 3) roof drain. The second floor sump collects liquids from 12 contributors. These are the second floor wash pad, second floor sink, Venturi scrubber, fibrous filter, Tank TK-6, Tank TK-7, Tank TK-202, aerosol mixing vessel, submerged gravel scrubber (SGS), nozzles cooling water, controls cooling water, and floor drains. The second floor wash pad, sink, and floor drain are potential contributors; all other second-floor contributors are considered inactive.

The third floor sump collects liquid from five contributors. These are the compressed air condensate, shower drain, demineralized water tank drain, two resin drains, and floor drain. The compressed air condensate is a routine contributor. The shower and floor drains are potential contributors; the other contributors are considered inactive.

Liquid collected by the roof drain flows into the upper floor sump process sewer line. This contributor is considered routine, although it is clearly weather-dependent.

3.2.2 Heating and Ventilation System

The liquid effluents contributing to the heating and ventilation system process sewer line are generated from two areas. These are the 1) second floor and 2) third floor. Two contributors, steam condensate and cooling water, are on the second floor. Two contributors, steam condensate and cooling water, are on the third floor. All four of these contributors are considered routine.

Table 3-1. Summary of Active Laboratory Wastewater Stream Contributors

Source	Contributor Status	Potential Contaminants	Stream Handling/ Rate of Discharge*
Upper Floor Sumps			• Flow rate = 3.35E-3 gal/min • Raw water effluent
Wash Pad	Potential contributor	Potential for radioactive contamination	Waste collects in second floor sump before discharge to 216-T-1 Ditch
Sink	Potential contributor	Potential for radioactive contamination	
Floor Drain	Potential contributor	Potential for radioactive contamination	
Roof Drain	Routine contributor	Potential for radioactive contamination	Waste collects in upper floor sump process sewer line before discharge to 216-T-1 Ditch
Compressed Air Condensate	Routine contributor	Potential for radioactive contamination due to location in Controlled Area	Waste collects in third floor sump before discharge to 216-T-1 Ditch
Shower Drain	Potential contributor	Potential for radioactive contamination	
Floor Drain	Potential contributor	Potential for radioactive contamination	
Heating and Ventilation System			• Sanitary water through swamp cooler flowrate = 3.5E-2 gal/min • Raw water supplied for steam • Total flow rate = 3.5E-2 gal/min
Third Floor Steam Condensate	Routine contributor	Potential for radioactive contamination due to location in Controlled Area	Waste is routed to heating and ventilation process sewer line before discharge to 216-T-1 Ditch
Third Floor Cooling Water	Routine contributor	Potential for radioactive contamination	

Table 3-1. Summary of Active Laboratory Wastewater Stream Contributors (cont.)

Source	Contributor Status	Potential Contaminants	Stream Handling/ Rate of Discharge*
Second Floor Steam Condensate	Routine contributor	Potential for radioactive contamination due to location in Controlled Area	Waste is routed to heating and ventilation process sewer line before discharge to 216-T-1 Ditch
Second Floor Cooling Water	Routine contributor	Potential for radioactive contamination	
Basement Laboratory Sump			• Flow rate = 1.4E-3 gal/min • Raw water effluent
Steam Line Condensate	Routine contributor	Potential for radioactive contamination due to location in Controlled Area	Waste is routed to the basement laboratory sump process sewer before discharge to 216-T-1 Ditch
Floor Drain	Potential contributor	Potential for radioactive contamination	
Sink	Potential contributor	Potential for radioactive contamination	
Control Room			• Flow rate = 1.4E-3 gal/min • Raw water effluent
Control Room Floor Drains	Potential contributor	Potential for radioactive contamination	Discharge to 216-T-1 Ditch

* Estimated flow rates are based upon a total annual flow divided by 526,000 minutes (1 year).

3.2.3 Basement Laboratory Sump

The process sewer line resulting from the basement laboratory sump collects liquid from six contributors. These are Hood Number 1, Hood Number 2, exchanger condensate, steam line condensate, floor drain, and sink. The floor drain is considered routine; all others are considered infrequent but potential.

3.2.4 Welder Cooling Water

Liquid effluent resulting from the cooling water used during welding operations is collected in a separate process sewer line. This contributor is considered inactive.

3.2.5 First Floor Aerosol Sampling Water

Water from the first floor aerosol sampling is collected in a separate process sewer line for discharge to the 216-T-1 laboratory wastewater stream. The liquid effluent is considered an inactive contributor.

3.2.6 Waste Tank TK-1

Four contributors generate liquid effluent collected in the waste Tank TK-1 process sewer line. These contributors are process water, pump lubricant water, steam condensate, and the large Tank TK-1 vessel drain. All of these contributors are considered inactive.

3.2.7 Process Cell Sump

Liquid effluent is collected from three contributors in the process cell sump process sewer line for discharge to the 216-T-1 Laboratory Wastewater Stream. These contributors are cooling water, steam condensate, and the floor drain. All of these contributors are inactive.

3.2.8 Control Room Floor Drains

Liquid collected in the control room floor drains is discharged through a separate process sewer line to the 216-T-1 Laboratory Wastewater Stream. There are two floor drains on the control room floor. This contributor is considered an infrequent but potential contributor.

4.0 RESPONSIBILITIES

The Effluent Treatment Programs group will act as Project Manager for the overall sampling program and will act as a liaison between T Plant and the regulators. The T-Plant Facility Manager is responsible for the sampling and analysis of the wastewater generated by the facility. In this regard, the facility manager (or designee) is responsible for:

- The completion and accuracy of this Sampling and Analysis Plan.
- Proper execution of the Sampling and Analysis Plan.
- Confirming the proper 216-T-1 Laboratory Wastewater Stream waste designation.

The following assignments are made to assist the facility manager in the execution of his or her responsibilities.

The T-Plant Facility Manager (or designee) will act as the Sampling Task Leader as defined in WHC-SD-WM-QAPP-011 and is responsible for:

- Evaluating final data packages against data quality objectives (DQO) set for these samples.
- Overseeing the sampling activities. Specific tasks include: ensuring the correct sample point is used; assisting with sampling team; ensuring facility safety guidelines are not compromised; arranging for appropriate equipment; providing trained personnel for sampling; and coordinating all field activities with established procedures.
- Assisting with the wastewater stream designation process.
- Ensuring data results are appropriately reported and a data file containing this Sampling and Analysis Plan, sampling logs, wastewater flow records, analytical data packages, and resulting reports is maintained.
- Requesting systems audits.
- Developing, initiating, and tracking corrective actions (if needed).

The Office of Sample Management or Project Manager's designee (OSM/designee) is responsible for:

- Identifying and approving the contract laboratory to perform chemical analysis for this sampling and analysis plan.
- Monitoring the contract laboratory for quality performance.
- Acting as an interface between the facility manager and the contract laboratory.
- Receiving laboratory data packages.
- Verifying that all laboratory results requested are received to ensure they are complete.
- Validating contract laboratory data packages.

The RCRA/CERCLA (Comprehensive Environmental Restoration Compensation and Liability Act) sampling team (Westinghouse Hanford Sampling and Mobile Laboratory) is responsible for:

- Supplying pre-printed labels.
- Ensuring samples are representative.
- Taking adequate blanks and other quality control samples as defined by SW-846, Chapter 1 (EPA 1986), and the specific details found in each analytical procedure.
- Maintaining accurate and complete sampling logs.
- Initiating a proper chain of custody (COC) for each sample.
- Ensuring samples are properly packaged and shipped.

The Sampling Task Leader shall be responsible for scheduling operators and health physics technicians (HPTs) to support the sampling team; reviewing data logs and sampling; surveilling chain of custody of samples and data; and ensuring analytical data is filed with the Environmental Data Management Center (EDMC). The T-Plant Sampling Task Leader shall prepare a data file on weekly composites in their offices and shall be responsible for maintenance of the file as quality records. The data in the file will include sampling logs, process flow records, analytical results, and calculations.

All protocol samples (non-routine samples that are to meet the quality assurance criteria of SW-846) will be collected (and preserved if required) by personnel trained to desk instruction T032 A-01 450 F, "Sampling Performed for RCRA Analysis" (Appendix A). The desk instructions are being replaced by Standard Sampling Procedures. Sampling team members for protocol samples shall have training in environmental sampling as discussed in WHC-CM-7-7, EII 1.7, "Indoctrination, Training, and Qualification" (WHC 1989).

The sampler shall make a written record of the sampling as required by procedure EII 1.5 (WHC-CM-7-7). The data shall include the sample number, time, date, location, flow information, and observations as a minimum. Copies of the written record shall be submitted to the T-Plant Sampling Task Leader. Originals will remain in controlled notebooks assigned to the Westinghouse Hanford Sampling and Mobile Laboratory (S&ML) personnel.

The chain of custody for protocol samples shall be maintained per EII 5.1 (WHC-CM-7-7) by the original sampler or member of the sampling team to the laboratory or point of shipping. A copy of the COC form is to be provided to OSM/designee before the sample is shipped. A copy of the shipping papers are provided to OSM/designee within 24 hours after shipping the sample. When the contracted laboratory's custodian receives the samples, he/she will complete the Westinghouse Hanford COC form and provide a copy to OSM/designee. The completed COC will be provided to OSM/designee with the data package. Completed chain of custody forms for protocol samples will be held by the OSM/designee. OSM/designee personnel will arrange for an approved onsite or offsite laboratory to do the analysis. This laboratory must meet the criteria of this Sample and Analysis Plan and the Liquid Effluent Sampling QAPP. Validation of protocol samples in the first year of sampling will be performed by OSM/designee to "Level B" in accordance with Section 2.0, "Data Validation for RCRA Analyses," of WHC-CM-5-3, Sample Management and Administration (WHC 1990a), or by another qualified organization using the same or equivalent procedures. The results of the first year sampling will be evaluated and validation of samples may be reduced to "Level A" validation in subsequent years if appropriate. OSM/designee will forward a copy of the data to T-Plant Sampling Task Leader and will be responsible for ensuring the data are properly prepared for public release and transmitted to the EDMC.

Protocol sampling will be performed by Westinghouse Hanford S&ML in accordance with written desk instructions and procedures as discussed above. Westinghouse Hanford S&ML samplers take responsibility for all phases of sampling for the samples they have drawn, including sample preservation, collection, storage, and shipment to the pre-arranged laboratory for analysis.

T-Plant Operational Health Physics technicians will survey and release the sample containers per WHC-CM-4-10, Section 11.0 (WHC 1988a). Westinghouse Hanford S&ML

personnel will deliver the radionuclide screening samples, taken at each sampling point to classify the total activity of the samples for shipping purposes, to the 222-S Laboratory. Sampling personnel are responsible for packaging the samples correctly, preparing papers to ship the samples to the analytical laboratory, and delivering the samples to Westinghouse Hanford shipping after total activity screening has been completed by 222-S Laboratory personnel. The laboratory will use an internal Westinghouse Hanford method, LA-508-113, "Low-Level Alpha and Beta in Large Volume Water Samples," to measure total activity in the sample. The results are compared to release limits in WHC-CM-4-10, Section 11.0, "Control and Storage of Radioactive Materials and Equipment." Handling and shipping of the samples will be performed in compliance with the requirements of Environmental Investigation Instruction 5.11, "Sample Packaging and Shipping."

In addition to protocol sampling, routine effluent samples are obtained from the wastewater stream by HPTs as directed by Environmental Protection. Process sampling is completed by Westinghouse Hanford staff who are trained to procedure WHC-IP-0692, Section 11.03.02 (WHC 1990b) and WHC-CM-7-4, Section 9 (WHC 1988b). These procedures describe sampling procedures including the taking of duplicate samples and COC requirements. The sampling and laboratory analysis methods currently used are not covered by the requirements of this SAP.

5.0 SAMPLING LOCATION, FREQUENCY, AND SCHEDULE

5.1 Sampling Location

Protocol and routine samples shall be taken from the inlet to the 216-T-1 Ditch. Figure 5-1 shows the outflow from the 221-T Building Head-End to the 216-T-1 Ditch. This inlet was selected as the sampling location to ensure that the sample includes all effluent contributors to the discharge to the 216-T-1 Ditch and is representative of the entire stream.

5.2 Sampling Frequency and Schedule

The frequency of sampling will be four times per year for the first year and one time per year thereafter. A total of four samples is the minimum number of samples suggested in SW-846 (EPA 1986) for both delisting and groundwater monitoring. The schedule of sampling the first year will be two samples during the period of November-March and two samples during the period April-October. Assuming that the initial four samples of the first year show no significant variability in stream constituents, sampling in subsequent years will consist of duplicate samples in each period, taken on alternate years. Therefore, the schedule for year two becomes duplicate samples taken in one of the time periods and for year three, duplicate samples are taken from the remaining time period. The analyses performed on these samples are discussed in Section 8.0. Explanation of the rationale for the frequency and scheduling of samples is given below.

Presently, the regular liquid effluents are primarily steam condensate and cooling water associated with the building air conditioning and heating. There are no known hazardous or toxic materials being added to the effluent as a result of routine operations. The basic assumption is that the composition of the effluent is essentially constant over time. There is, however, a potential for variation in the flow (amount) during the year. This is because the flow rate is partially dependent upon the amount of steam being used and the corresponding volume of steam condensate generated and partially dependent on the rainfall. In the colder months of the year (November-March), the volume of condensate is greater than in the warmer months of the year (April-October). Thus, it was decided that a stratified random sampling methodology, as discussed in Chapter 9 of SW-846 (EPA 1986), was appropriate. Two samples from each of the two time stratum (November-March and April-October) were identified as the minimum needed to make an estimate of sample variability between strata (Chapter 9, SW-846, EPA 1986). The two samples from each stratum will be chosen at random from a list of all workdays in the time period.

The sampling scheme is designed to ensure representative samples by following SW-846 (EPA 1986) sampling and analytical protocol. This protocol requires that a sufficient number of samples be taken, in a random manner, over a sufficient time period to

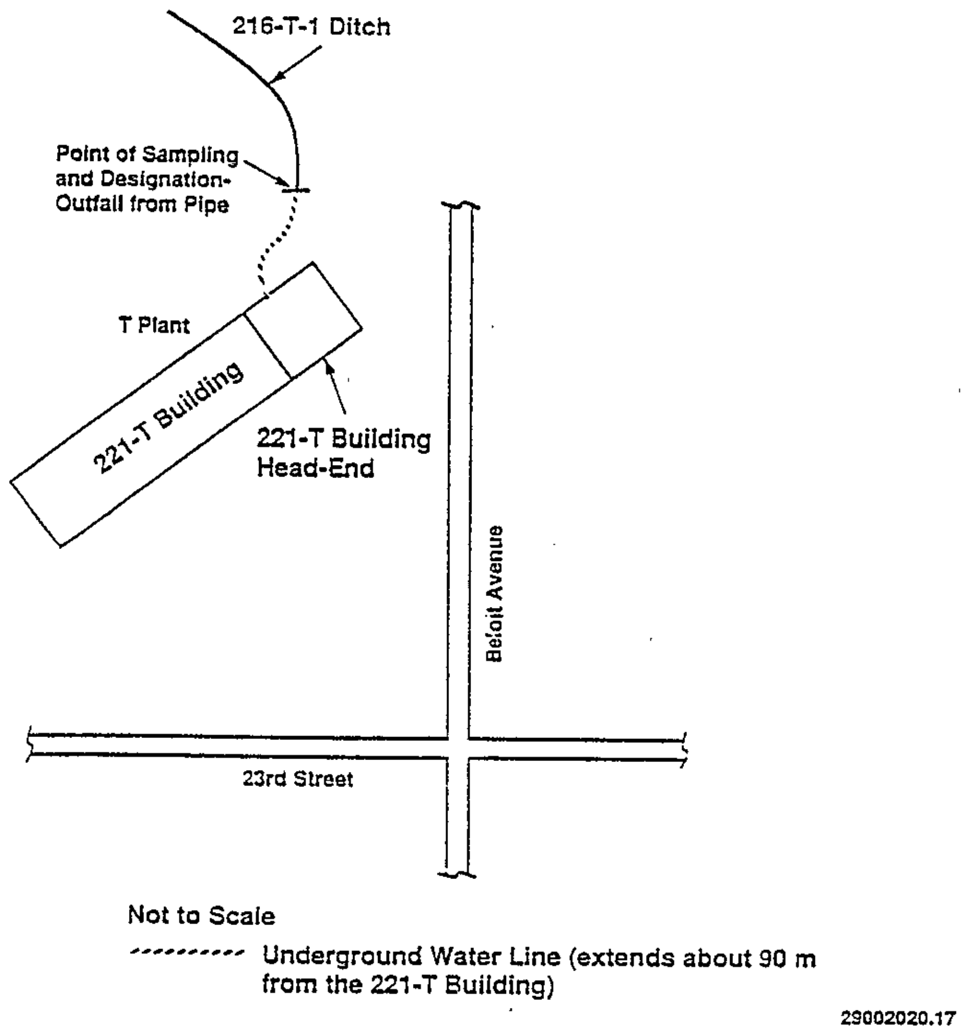

Figure 5-1. Piping Diagram for Liquid Effluents Discharged to the 216-T-1 Laboratory Wastewater Stream

characterize the variability or uniformity of the stream. Grab samples will be collected on a random time basis. The sampling will be randomized by randomly choosing one of the workdays of the period to be sampled. The process is repeated to select a second sample date.

Protocol sampling will be initiated within three months of approval of this plan by the regulators and a contract laboratory by OSM/designee. The results of the first year's sampling will be evaluated and subsequent sampling will be performed on each period on alternate years unless there is evidence of significant differences between the streams as evidenced in the analytical results of the first year.

Field duplicate samples, field blanks, trip blanks, and equipment blanks and other Quality Control (QC) samples will be taken during each sampling event as defined in the referenced procedures and Section 10 of the Liquid Effluent Sampling QAPP. A sample of the T-Plant sanitary and raw water supply (the major components of the effluent stream) also will be taken during each protocol sampling event and analyzed for the full set of analytes listed in Section 8.0. The duplicate samples, blanks, and other QC samples will be evaluated per Section 2 of WHC-CM-5-3, or by another qualified organization using the same or equivalent procedures. The sanitary and raw water samples will provide information on initial water quality for water used in T-Plant processes and allow assessment of the impact of T-Plant uses on the water quality.

Due to the inconsistent nature of the flow rate of the liquid effluents from the 221-T Building Head-End, the flow may at times diminish to an insufficient level for sampling. In this case, adherence to the above described sampling frequency and schedule may not be possible. Modifications to the sampling frequency and schedule may be made to coincide with the sampling event with the availability of discharge.

Routine effluent sampling will be performed only if effluent volumes significantly increase and/or test activities in the 221-T Building Head-End facility resume. Presently, the flow rates into the 216-T-1 Ditch are not sufficient to enable routine sampling. If routine sampling is initiated, it shall comply with Westinghouse Hanford Procedure WHC-IP-0692, "Collection of Surface Water Samples" at a frequency and schedule as listed in Table 5-1.

Table 5-1. Potential Routine Effluent Samples, Analytes, and Procedures

Analysis	Frequency/Schedule[*]	WHC Procedure
pH	Weekly	WHC-CM-7-4, Section 9; LA-212-102
Temperature	Weekly	WHC-CM-7-4, Section 9; WHC-IP-0692
gross alpha (filt)	Monthly (composite of weekly samples)	WHC-CM-7-4, Section 4; LA-508-113
gross alpha (solids)	Monthly (composite of weekly samples)	WHC-CM-7-4, Section 4; LA-508-113
gross beta (filt)	Monthly (composite of weekly samples)	WHC-CM-7-4, Section 4; LA-508-113
gross beta (solids)	Monthly (composite of weekly samples)	WHC-CM-7-4, Section 4; LA-508-113
gamma (filt)	Monthly (composite of weekly samples)	WHC-CM-7-4, Section 4; LA-548-121
gamma (solid)	Monthly (composite of weekly samples)	WHC-CM-7-4, Section 4; LA-548-121
Strontium (filt)	Monthly (composite of weekly samples)	WHC-CM-7-4, Section 4; LA-220-103
Strontium (solid)	Monthly (composite of weekly samples)	WHC-CM-7-4, Section 4; LA-220-103
Nitrate	Quarterly	WHC-CM-7-4, Section 4; LA-553-101
Tritium	Quarterly	WHC-CM-7-4, Section 4; LA-218-111

[*] May be modified to coincide with availability of discharge.

6.0 SAMPLE DESIGNATION

6.1 Protocol Sample Labeling

Labels for protocol samples shall be furnished by the sampling team from the S&ML Unit. The labels will require the following information to be recorded by a member from the sampling team: identification of the sampler; a unique sample identification number; date and time the sample was collected; the place the sample was collected; preservative type added or "none"; and analyses to be performed on the aliquot. In addition, each bottle shall be identified with the bottle lot number and individual bottle number. Sample numbers will be assigned by OSM/designee using the Hanford Environmental Information System (HEIS).

6.2 Routine Effluent Sample Labeling

A unique sample number, assigned by OSM/designee, shall be provided for each sample. Currently, the routine monitoring samples drawn by the Westinghouse Hanford Site Surveillance/Health and Safety Group are labeled with a preprinted stick-on label that contains the following information: sample type, sample location, sample name, sample analyses, sampling date, a space for the sampling time, charge code, and authorization initials. The HPTs fill in the sample time and temperature of sample at the time of sampling. The information on the label is described in WHC-IP-0692, Section 11.03.02 and WHC-CM-7-4, Section 4.7, "Sample Containers and Labels" (WHC 1988b).

7.0 SAMPLING EQUIPMENT AND PROCEDURES

7.1 Protocol Samples

A. Equipment

Samples may be obtained at the discharge location by using a dipper apparatus as described in Volume 2, Chapter 9 of SW-846.

Preventive maintenance on protocol sampling equipment will be performed by the S&ML Unit as required. Preventive maintenance will consist of 1) keeping on hand the appropriate bottles and sampling apparatus (dipper) to obtain the samples discussed below and in Section 8.0 and 2)ensuring that sampling equipment has been prepared according to EII 5.5, "1706 KE Laboratory Decontamination of RCRA/CERCLA Sampling Equipment."

No flow monitoring equipment is used for this wastewater stream (all flow rates provided in this report are estimates) and there is no power or moving equipment used in the sampling, thus the spare parts list will consist of maintaining 10 or more extra bottles of each type listed in the paragraph below (a through j).

Sample bottles shall be new, commercially available, certified precleaned glass or plastic bottles as appropriate. The sample shall be drawn only with a new precleaned bottle. The sample volumes and number of containers are prescribed by the contract analytical laboratory and are subject to change; however, representative examples for the analytes of interest are provided in Section 8.0, Tables 8-1 and 8-2 and the final selection is expected to be similar. Examples of bottle types, preservatives, and sample volumes are listed below.

a. 125 ml plastic container, no preservative for Ion Chromatography of anions (Cl^-, NO_3^-, $SO_4^=$, F^-) and pH determination

b. 1000 ml plastic container, pH <2 by nitric acid preservative for metals determined by method 6010. A second 500-ml container preserved as above for mercury by method 7470

c. 250 ml plastic container, pH <2 by sulfuric acid preservative for Total Organic Carbon (TOC)

d. 250 ml glass container with a tetrafluoroethylene lined septum cap, pH <2 by sulfuric acid preservative for Total Organic Halogens (TOX). Containers for Total Organic Halogens shall be filled without bubble formation and without leaving a head space

e. 125 ml glass container for Total Dissolved Solids (TDS)

f. 125 ml glass container, pH <2 with sulfuric acid preservative for ammonia

g. 1 liter plastic container, pH <2 with nitric acid, for gross alpha and beta

h. 1 liter plastic container, pH <2 with nitric acid, for gamma, radium, uranium

i. 1 liter plastic container, pH >9 with zinc acetate and sodium hydroxide for H_2S

j. 40 ml brown glass vial with a tetrafluoroethylene lined septum cap, 0.008% $Na_2S_2O_3$ for volatile organic compounds (VOC)

B. <u>Procedures</u>

The protocol sampling procedures have been discussed in Section 4.0 and are summarized in Table 7-1. These documents are based on recommended practices found in SW-846, Volume 2, Chapter 9.

Corrective Action requirements are those identified in Section 14.0, "Corrective Actions" of the Liquid Effluent Sampling QAPP. Document control will meet the requirements of WHC-CM-4-2, "Quality Assurance Manual", Section QR 6.0 (WHC 1988c).

7.2 Routine Effluent Samples

If routine sampling is initiated by Westinghouse Hanford, the effluent samples will be collected by technicians from the Site Surveillance/Health and Safety Group trained to Westinghouse Hanford Procedure WHC-IP-0692, "Collection of Surface Water Samples." The wastewater stream sample shall consist of two 1-liter aliquots.

The collected samples will be labeled with a sample tag containing the information discussed in Section 6.2. The samples will then be taken to the designated onsite laboratory for analysis via the methods listed in Table 5-1.

A Data Sheet will be filled out at the time of sampling and contains date, time, and the sampler's initials (WHC 1990b). The completed Data Sheet will be delivered to the 222-S Laboratory, who in turn sends the documentation and results to Environmental Assurance (EA). The data sheet will be filed by EA with the completed analytical results from the laboratory. Data that have been validated will be incorporated into quarterly and annual reports by EA.

Table 7-1. Supporting Procedures for Sample Analysis Plan Protocol Sampling Activities

	Procedure/Section Number	Source Document
Field Logbooks	1.5	WHC-CM-7-7
Indoctrination, Training & Qualification	1.7	WHC-CM-7-7
Administration of Radiation Surveys	2.3	WHC-CM-7-7
Chain of Custody	5.1	WHC-CM-7-7
Field Documentation of Drilling, Well Development, and Sampling Equipment	5.4	WHC-CM-7-7
1706 KE Laboratory Decontamination of RCRA/CERCLA Sampling Equipment	5.5	WHC-CM-7-7
Sample Packaging and Shipping	5.11	WHC-CM-7-7
Onsite Packaging Systems	II2.7	WHC-CM-2-14
Offsite Packaging Systems	II2.8	WHC-CM-2-14
Onsite Routine Radioactive Shipments	IV1.4	WHC-CM-2-14
Offsite Shipping Procedures	IV3.0	WHC-CM-2-14
Sampling Performed for RCRA Analysis (Desk Instruction)	T032 A-01 450 F	Appendix A
Data Validation for RCRA Analysis	2.0	WHC-CM-5-3
Control and Storage of Radioactive Materials and Equipment	11.0	WHC-CM-4-10

8.0 SAMPLE ANALYSIS AND HANDLING

8.1 Protocol Sample Analysis

Protocol samples will be analyzed for the constituents identified in Tables 8-1 and 8-2 to confirm that the wastewater stream is not hazardous. The analytes and screening analyses chosen were based on constituents known or suspected to be associated with the wastewater stream and were determined after review of constituents detected during past characterization activities (including sampling results), assessment of process knowledge, and evaluation of chemicals stored in the plant (WHC 1991c, WHC 1989, Jeppson 1990). Based on the process knowledge discussed in the previous chapters, it was decided that some of the waste characterization tests would not be required. These include ignitability and reactivity.

Any analyte that had been detected in previous sampling or was considered a potential routine contributor to the wastewater stream was further considered. Any detected constituent or screening analysis that gave a positive result and was regulated by WAC 173-303 and/or 40 CFR Part 268 was included in the list of analytes. The indicated analyses include barium, cadmium, lead, mercury, nickel, acetone, 2-chloronapthalene, methylene chloride, pH and TOX.

A second group of analytes was chosen to assist in the objective of providing data for calculation of soil loading and migration. These analytes are those listed in EPA's Primary and Secondary Drinking Water Standards (40 CFR Parts 141 and 143; EPA 1985a and b) and although they are not applicable to this wastewater stream, they supply target concentration limits and an indication of water quality being released.

A third group of analytes has no regulatory reference, but these analytes have been detected in the 216-T-1 Laboratory Wastewater Stream effluent and are included for purposes of providing data for calculation of soil loading. The TOC analysis was added, because when considered together with the other data that will be generated, it provided a means to detect potential upsets or changes in the wastewater stream. The constituents from these three groups are listed in Table 8-1.

A fourth group of analytes was chosen in order to provide an additional level of assurance that the wastewater stream characterization performed in WHC-EP-0342, Addendum 32, (Jeppson 1990) was valid. This fourth group of analytes is listed in Table 8-2 and includes the following:

- Any constituent not included in Table 8-1 that is present in the SARA chemical inventory for 221-T Building Head-End and/or is stored or used in an area from which a drain goes to the 216-T-1 Laboratory Wastewater Stream.

Table 8-1. Analytes of Interest for 216-T-1 Laboratory Wastewater Stream Effluent

Analysis Name	Regulatory Reference	Analytical Procedure	Container	Container Size (ml)	Preservatives	Holding Time
Aluminum	1,2	6010[6]	P,G	1000	HNO_3 to pH <2	6 mo
Barium	1,3,4	6010	P,G	1000	HNO_3 to pH <2	6 mo
Boron	--	6010	P,G	1000	HNO_3 to pH <2	6 mo
Cadmium	1,3,4	6010	P,G	1000	HNO_3 to pH <2	6 mo
Calcium	--	6010	P,G	1000	HNO_3 to pH <2	6 mo
Copper	1,2	6010	P,G	1000	HNO_3 to pH <2	6 mo
Iron	2	6010	P,G	1000	HNO_3 to pH <2	6 mo
Lead	1,3,4	6010	P,G	1000	HNO_3 to pH <2	6 mo
Lithium	--	6010	P,G	1000	HNO_3 to pH <2	6 mo
Magnesium	--	6010	P,G	1000	HNO_3 to pH <2	6 mo
Manganese	2	6010	P,G	1000	HNO_3 to pH <2	6 mo
Mercury	1,3	7470	P,G	500	HNO_3 to pH <2	28 d
Nickel	3,4	6010	P,G	1000	HNO_3 to pH <2	6 mo
Potassium	--	6010	P,G	1000	HNO_3 to pH <2	6 mo
Silicon	--	6010	P,G	1000	HNO_3 to pH <2	6 mo
Sodium	--	6010	P,G	1000	HNO_3 to pH <2	6 mo
Strontium	--	6010	P,G	1000	HNO_3 to pH <2	6 mo
Vanadium	--	6010	P,G	1000	HNO_3 to pH <2	6 mo
Zinc	2,5 (as sulfate)	6010	P,G	1000	HNO_3 to pH <2	6 mo
pH	2,4	9040[6]	P,G	125	none	ASAP[13]
TOC	--	9060[6]	P,G	250	Cool to 4°C, HCL or H_2SO_4 to pH <2	28 d
TOX	4	9020[6]	G[11]	250	cool to 4°C, H_2SO_4 to pH <2	7 d
TDS	2	160.1[7]	P,G	125	cool 4°C	48 hrs[13]
Iodide	--	345.1	P,G	100	none	NA
Chloride	2	300.0[8]	P,G	125	none	28 d
Fluoride	1,2	300.0	P	125	none	28 d

Table 8-1. Analytes of Interest for 216-T-1 Laboratory Wastewater Stream Effluent (cont.)

Analysis Name	Regulatory Reference	Analytical Procedure	Container	Container Size (ml)	Preservatives	Holding Time
Sulfate	2,5	300.0	P,G	125	cool 4°C	28 d
Nitrate	1	300.0	P,G	125	cool 4°C	48 h[13]
Ammonia	5	350.3[7]	P,G	250	cool 4°C H_2SO_4 to pH <2	28 d
Acetone	3,4	8240[6,14]	P,G	40[11]	cool 4°C, 0.008% $Na_2S_2O_3$	14 d
2-Chloro-naphthalene	3,4	8270[6,14]	P,G	1000	cool 4°C, 0.008% $Na_2S_2O_3$	7 d[12]
Methylene Chloride	3,4	8240[6,14]	P,G	40[11]	cool 4°C, 0.008% $Na_2S_2O_3$	14 d
Chloroform (Trichloromethane)	1,3,4,5	8240[6,14]	P,G	40[11]	cool 4°C, 0.008% $Na_2S_2O_3$	14 d
Gross Alpha	1	9310[6]	P,G	1000	HNO_3 to pH <2	6 mo
Gross Beta	1	9310	P,G	1000	HNO_3 to pH <2	6 mo
Gamma	1	901.1[9]	P,G	1000	HNO_3 to pH <2	6 mo
Radium (total alpha emitting)	1	9315[6]	P,G	1000	HNO_3 to pH <2	6 mo
Uranium	5 (as nitrate)	00.07[10]	P,G	1000	HNO_3 to pH <2	6 mo

P = Plastic
G = Glass
[1] 40 CFR Part 141, National Primary Drinking Water Regulations (EPA)
[2] 40 CFR Part 143, National Secondary Drinking Water Regulations (EPA)
[3] 40 CFR Part 268, Land Disposal Restrictions (EPA)
[4] WAC 173-303, Dangerous Waste Regulations (Washington State)
[5] 40 CFR Part 302, Designation, Reportable Quantities and Notification
[6] Test Methods for Evaluating Solid Wastes, SW-846, Third Edition, US EPA/Office of Solid Waste and Emergency Response, 1986.
[7] EPA-600/4-79-020, Methods for the Chemical Analysis of Water and Wastes, US EPA, EMSL, 1979.
[8] EPA-600/4-84-017, The Determination of Inorganic Anions in Water by Ion Chromatography, US EPA, 1984.
[9] EPA-600/4-80-032, Prescribed Procedures for Measurement of Radioactivity in Drinking Water, US EPA, 1980.
[10] EPA-520/5-84-006, Eastern Environmental Radiation Facility (EERF) Radiochemistry Procedures Manual, US EPA, 1984.
[11] Tetrafluoroethylene lined cap required.
[12] 7 days to extract, 40 days after extraction.
[13] For analyses with short holding times, onsite analyses may be required.
[14] For the first year's testing, the entire target compound list of the SW-846 Method will be requested as well as tentatively identified compound (TIC) reporting.

Table 8-2. Additional Analytes of Interest for 216-T-1 Laboratory Wastewater Stream Effluent

Analysis Name	Regulatory Reference	Analytical Procedure	Container	Container Size (ml)	Preservatives	Holding Time
Ag	2,3,4	6010[6]	P,G	1000	HNO_3 to pH <2	6 mo
Zr	—	6010	P,G	1000	HNO_3 to pH <2	6 mo
Hg	1,3,4,5	7470[6]	P,G	500	HNO_3 to pH <2	28 d
Ti	—	6010	P,G	1000	HNO_3 to pH <2	6 mo
VOCs[9] Benzene Toluene 1,1,1-Trichloroethane Vinyl Chloride 2-Butanone (MEK)	1,3,4,5	8240[6]	G[8]	40[8]	cool to 4°C 0.008% $Na_2S_2O_3$	14 d

P = Plastic
G = Glass
[1] 40 CFR Part 141, National Primary Drinking Water Regulations (EPA)
[2] 40 CFR Part 143, National Secondary Drinking Water Regulations (EPA)
[3] 40 CFR Part 268, Land Disposal Restrictions (EPA)
[4] WAC 173-303, Dangerous Waste Regulations (Washington State)
[5] 40 CFR Part 302, Designation, Reportable Quantities and Notification
[6] Test Methods for Evaluating Solid Wastes, SW-846, Third Edition, US EPA/Office of Solid Waste and Emergency Response, 1986.
[7] EPA-600/4-84-017, The Determination of Inorganic Anions in Water by Ion Chromatography, US EPA, 1984.
[8] Tetrafluoroethylene lined septum cap required.
[9] For the first year's testing the entire target compound list of the SW-846 method 8240 will be requested as well as tentatively identified compound (TIC) reporting.

- Any constituent not included in Table 8-1 but reported in the process data section of WHC-EP-0342 (Jeppson 1990). These constituents were identified in analyses of 200 West Area sanitary water or in "like" sanitary water and steam condensate wastestreams as those of the T-Plant Head-End Facility.

- 2-Butanone (MEK), which was found in a blank sample associated with the sampling reported in WHC-EP-0342 (Jeppson 1990). It is most likely that this compound was a result of contamination during sampling or analysis; however, it will be analyzed for during the first year's sampling.

Methanol and butanol were identified as potential trace analytes of interest; however, they would only be regulated if they were of sufficiently high quantity to cause the effluent to fail an ignitability criteria. There is no significant probability of this occurring, thus they are not analyzed for.

The analyses proposed in Tables 8-1 and 8-2 provide a means to detect the individual constituents of interest. The inclusion of a number of screening analyses (pH, TOC, TDS, TOX) will also provide a warning if there were to be a failure of engineered or administrative barriers. In addition, samples submitted for semi-volatile (Method 8270) and volatile (Method 8240) testing during the first year will request a complete analysis of all target compounds listed for the method, as well as Tentatively Identified Compound (TIC) reporting. It is anticipated that the analytes and analyses proposed in Table 8-2 will only be performed during the first year (four samples). If the results of the first year of analyses confirm their absence, these analyses will be dropped.

Detection limits for the various constituents and screening analyses shall be consistent with the limits given in each applicable reference procedure.

The methods chosen and listed in Tables 8-1 and 8-2 for protocol samples are for the most part those called out in WHC-SD-WM-QAPP-011. In the case of the anions (Cl^-, F^-, $SO_4^{=}$, NO_3^-) the use of ion chromatography EPA Method 300.0 (EPA 1984b) allows all anions to be determined from one sample via one measurement versus six different analyses. Ion chromatography is an established methodology available in most analytical service laboratories. In addition, the methods cited for these analytes in the QAPP use various hazardous chemicals for the analysis, including mercury, barium, sulfuric acid, brucine, and diazomethane. Ion chromatography typically uses a benign carbonate buffer system for these analyses.

Similarly, the use of SW-846 Method 6010, "Inductively Coupled Plasma Atomic Emission Spectroscopy," will allow most of the metals identified in Tables 8-1 and 8-2 to be analyzed from one sample as compared to at least seven separate analyses if the QAPP is followed verbatim. Method 6010 is an EPA method that is commonly used by service laboratories.

8.2 Protocol Sample Handling

The handling and preparation of samples will comply with the procedures discussed in Section 5.0 and found in the Environmental Investigations and Site Characterization Manual, WHC-CM-7-7. The COC shall comply with the Procedure EII 5.1, "Chain of Custody." A COC form will be filled out and will accompany each protocol sample. A sample may consist of several containers. The COC will account for each container. The preparation of either a single or a group of samples for shipment to a laboratory shall comply with the

Procedure EII 5.11, "Sample Packaging and Shipping," and supporting procedures listed in Table 7-1.

A COC form will be filled out at the time of bottle preparation (preservative addition and pre-labeling) and will accompany each sample. Once the sample has been drawn, it must be in the physical control or view of the custodian, locked in an area where it cannot be tampered with, or prepared for shipping with tamper-proof tape applied. Physical control includes being in the sight of the custodian, being in a room that will signal an alarm when entered, or locked in a cabinet. When more than one person is involved in sampling, one person shall be designated and only that person signs as sampler. This person is the custodian until the samples are transferred to another location, group, or sampler, and shall sign when releasing the samples to the designated receiver. The Liquid Effluent Sampling QAPP contains a copy of the COC form to be used. A private carrier used to transport the samples and COC documentation shall be bonded.

Field notes will be kept by sampling personnel that identify date, time, weather conditions, plant operational status, and any other relevant information from each sampling event. Field notes will be completed per guidance in Section 6.0 of the Liquid Effluent Sampling QAPP and EII 1.5, "Field Logbooks" (Table 7-1).

The approved laboratory shall designate a sample custodian and a designated alternate responsible for receiving all samples. The sample custodian or his alternate shall sign and date all appropriate receiving documents at the time of receipt and at the same time initiate an internal COC form using documented procedures. A continuous COC will be maintained from the time of sampling until final disposition of all samples.

Analytical procedures for protocol samples shall meet the quality assurance requirements of SW-846. The statement of work for completing the analysis shall require the approved laboratories to have existing standard operating procedures and to submit any changes in their procedures during the contract term to the OSM/designee for approval. The approved laboratory procedures shall describe quality control, calibration, data reduction, verification, and reporting in sufficient detail to ensure compliance with the Liquid Effluent Sampling QAPP.

The protocol samples will be routed to an approved Westinghouse Hanford participant contractor or subcontractor laboratory for analysis consistent with SW-846 requirements. The data will be considered representative when at least 90 percent of the data points meet the established requirements in the laboratory contract for precision and accuracy. The established limits for accuracy and precision shall be consistent with SW-846 (or other applicable procedure) requirements. QC sample results will be reviewed against the laboratory or method specific acceptance criteria for accuracy and precision. Accuracy and precision acceptance criteria will be equal to or better than $\pm$ 25% (Nguyen 1991). Data which does not meet this objective will be reviewed to determine whether the data can be used or whether corrective action should be taken. If necessary, corrective action will consist of repeating the sampling and analysis activity. Corrective action methods are as discussed in Section 14.0 of the Liquid Effluent Sampling QAPP (Nguyen 1991). All data will be sent to the Westinghouse Hanford Environmental Data Management Center (EDMC) for transmittal to the regulators. Data which is not acceptable should be flagged to identify its status. The data will be part of the administrative record for Tri-Party Agreement milestones.

All sampling and analytical data and field notes will be maintained by the Sampling Task Leader as quality records. Copies of the Sample Analysis Request Form, Chain of Custody, activity screening results, and shipping papers are forwarded to OSM/designee as discussed in Section 4.0. The original shipping papers accompany the sample. Copies of the Sample Analysis Request Form and Chain of Custody are returned to OSM/designee from the laboratory after the samples are received. The original shipping papers are kept by the laboratory with the copies maintained by OSM/designee.

8.3 Routine Effluent Samples

If routine sampling is implemented, the handling of the samples shall be according to the Westinghouse Hanford Procedure WHC-IP-0692, "Collection of Surface Water Samples." This procedure describes how the samples are prepared and labeled, how information is logged, and how samples are transferred between the sampler and the laboratory. The procedure requires the use of COC and tamper evident tape.

The proposed analyses and frequency of analyses performed on the routine wastewater stream samples are discussed in Section 5.0. An onsite service laboratory, currently the 222-S Laboratory, will perform the analysis using current approved procedures and quality assurance requirements. The data sheets from the service laboratory will be retained by EA.

8.4 Comparison of 216-T-1 Laboratory and 216-T-4 Wastewater Streams Analytes

Discussions with T-Plant staff indicate that the effluent presently being discharged to the 216-T-1 Ditch may be rerouted to combine with streams charged to the 216-T-4 Ditch. In the event that the effluents from the T-Plant Head-End facility are rerouted to the 216-T-4 Ditch, the two SAPs will be combined. Analytes of interest in the two SAPs were compared, and any constituent reported in Tables 8-1 and 8-2 of this plan for the 216-T-1 Laboratory Wastewater Stream, but <u>not</u> identified in the 216-T-4 Wastewater Stream SAP as an analyte of interest, is listed below.

- Lead
- Nickel
- Vanadium
- Chloroform

- Benzene
- Vinyl Chloride
- 2-Butanone
- Toluene
- 2-Chloronapthalene.

9.0 REFERENCES

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APPENDIX A

SAMPLING PERFORMED FOR RCRA ANALYSIS

PROCESS LABORATORIES AND TECHNOLOGY (PLT)		Section	T032 A-01 450 F
		Page	Page 1 of 9
DESK INSTRUCTIONS		Effective Date	July 6, 1990
		Organization	Waste Sampling and Monitoring (WS&M)
TITLE: SAMPLING PERFORMED FOR RCRA ANALYSIS		Approved by WS&M Manager/PLT Manager	

PURPOSE - This desk instruction defines the criteria and methodology to be used by Waste Sampling and Monitoring personnel when sampling materials for analyses performed in compliance with the Resource Conservation and Recovery Act of 1976 (RCRA) protocol. This instruction also includes criteria for sample custody and transport of samples to an assigned laboratory for analyses.

APPLICABILITY - The use of this desk instruction is limited to those sampling situations in which RCRA compliance is needed, and safe radiation levels and personnel trained in the necessary procedures are all present. This desk instruction is intended for use specifically while taking samples of process liquid effluents, containerized liquids, soil and water for hazardous waste characterization.

SAFETY - Sampling will be performed inside process buildings and in the field where unusual personnel hazards may be encountered. Environments in each facility may be different from one sampling time to the next. An operator(s) assigned to the facility and a Health Physics Technician (HPT) from the facility will be available as required each time sampling is performed. The radiation level will be established and the radiation level of the sample to be taken will be estimated prior to sampling. Direct contact with the samples during handling operations will be required. Therefore, care must be exercised to minimize radiation exposure to the sampling team as much as possible and in all cases avoid unacceptable radiation levels.

Radiation levels of samples taken will have dose levels established by the HPT covering the job. The dose levels must be within acceptable limits of the laboratory before the sample is to be delivered for analyses. Sample containers will be verified to have no smearable radionuclide contamination detectable.

Radiological conditions, Radiation Work Procedures, dress requirements, job safety items, and other pertinent procedures will be discussed with the cognizant field contact prior to sampling.

Samples will be transported to both onsite and offsite laboratories for analysis. Special requirements for transport of hazardous materials (radiological and chemical apply to each situation. The following provides definition of onsite and offsite shipments per MRP 5.20.

<u>Offsite Shipment</u> -- A shipment intended for transport outside the project boundary (south of the 1100 Area) or to any licensee other than Pacific Northwest Laboratory in the 3000 Area. Shipments to U.S. Testing and Advanced Nuclear Fuels are offsite shipments.

<u>Onsite Shipment</u> -- A shipment which is transported wholly within the Hanford Site boundaries between U.S. Department of Energy contractors.

1. <u>Inter-area Shipment</u> - A movement between Hanford Site Security Areas (e.g., 300, 200W, 200E, 100N, etc.).

2. <u>Intra-area Shipment</u> - A movement between buildings within a security area (e.g., 300, 200W, 200E, 100N, etc.) but not within the confinement boundaries of a building or facility.

<u>Pre-Job Planning</u>

1. Verify that a Sampling Authorization Form (SAF) has been completed and approved.

2. Verify sampling schedule with the Manager, Waste Sampling and Monitoring.

3. Initiate Chain-of-Custody

   - Record the following information on the Chain-of-Custody form:

     - Chain-of-Custody number
     - Cognizant individual from Office of Sample Management (OSM)
     - Sample location
     - Sample analysis and identification information from SAF including volume of sample
     - SAF number

4. If known hazardous constituents will be sampled a Hazardous Material Shipping Record (HMSR) may be required. Verify HMSR requirements and special hazardous materials packaging requirements on SAF, notify and schedule Transportation Logistics for sampling activities if a HMSR is required.

5. Equipment/Supplies Preparation

- Assemble equipment and supplies as specified on SAF.
- If samples are to be transported to offsite laboratories a special sample must be taken for radionuclide analysis. Prepare sample container for use in special radionuclide analysis.
- Withdraw sample containers specified on SAF from secured storage area.
- Verify sample containers have statements of certification to meet Environmental Protection Agency (EPA) Standards (Protocol A, B, or C as appropriate for sample being taken) for cleanliness.
- Prepare a label and a seal for each sample container.
- Prepare trip blank, equipment blanks, and splits/duplicate bottles as specified on SAF.
- Add preservatives to sample bottles as specified on SAF.
- Prepare ice chest(s).

6. Notebook Documentation

- Sampling Point and Method: This description must be precise and in sufficient detail that the sampling point can be relocated by another person soley from the written description. Also, photographs of the sampling point with visible points of reference are aids but can not be considered legal evidence. Method of sampling should include reference to meeting the intent of the SW-846 sampling method (e.g., dip sampler, etc.). Deviations from standard methods must be descriptive and the reason for the deviations recorded.
- Sample Identification: Each container filled will be identified in the notebook with a description of the container and the analyses to be performed. Record the precise time and date of sampling. Record description of sample, color, multiple phases, soils, liquid, etc.
- Transportation: Record the method of transportation vehicle number, and destination of the samples. Include holding overnight while radionuclide content is being determined.

- Record all sample survey information.
- Names of Other Participating in the Sampling: Include HPT's, operators, engineers, etc.
- Comments: This section is used to denote any deviations from expected sampling method or sampling operation. Observations made concerning anomalies (e.g., surrounding environment, plugged or inoperable sample valves, newly installed sample system) may be important in interpretation of data quality.
- Signatures: All samplers sign and date each page of notebook entries. All changes must be initialed.
- References: Record the Chain-of-Custody number in the notebook. Any applicable references to other documents (e.g., field notebooks, sampling plans, etc.) should be included.

Sampling

1. Review sampling activities, job requirements, and safety considerations with field contact.
2. Have HPT survey sampling area for radiation and contamination levels as required at the location.
3. Perform sampling and field analysis per approved SAF and appropriate EPA protocol.
4. Bring collected samples out of the sample collection area.
5. Have sample containers monitored for smearable contamination.
6. If smearable contamination is greater than 2200 dpm/100cm^2 beta-gamma or 200 dpm/200cm^2 alpha, and sample is not for volatile organics, decontaminate container or transfer sample to clean bottle and repeat Steps 5 & 6.
7. If sample is for volatile organics and smearable contamination is greater than 2200 dpm/100 cm^2 beta-gamma or 220 dpm/100 cm^2 alpha, decontaminate or resample.
8. Place tamper indicating seal on sample bottles.
9. Bag samples in plastic bags.

10. Place samples in ice chests. Verify that sufficient ice is present to keep samples cold until they are delivered to the laboratory.

Chain-of-Custody Documentation

Record the following on the Chain-of-Custody form:

- Sample Collection Data: Print name, mailing address and phone number of person(s) performing the sampling, date and time sample is collected.
- Ice Chest No.: Record ice chest number or write NA if not applicable.
- Field Logbook and Page No.: Record WHC-N-book number and page number.
- SAF No.: Record number from Sampling Authorization Form.
- Remarks: In certain cases, additional information on sample location or other comments may be helpful in data interpretation or evaluation. Enter all appropriate information as desired.
- Bill of Lading No.: Record offsite shipping paper numbers (i.e., HMSR, RSR, etc.). Shipping papers are required for offsite shipping. Record HMSR number in HMSR log book.
- Method of Shipment: Enter mode of transport and vehicle number.
- Shipped To: Enter the name of the laboratory and individual destined to receive the samples. Include address and phone number. Record this information on HMSR and offsite RSR.
- Chain of Possession: The sampler upon transferring custody of the sample to another individual will sign (printed and signature) in the "Relinquished by" block. The receiver will verify sample integrity (check evidence tags and/or inventory containers) and sign (printed and signature) in the "Received by" block and date/time the transfer was made. This step is repeated each time the sample changes custody.
- Original copy of Chain-of-Custody remains with the sample. A copy of the Chair-of-Custody form is to be made and sent to the Office of Sample Management.

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SAMPLING PERFORMED FOR RCRA ANALYSES	Effective Date	July 6, 1990
	Organization	Waste Sampling and Monitoring (WS&M)

<u>Onsite Sample Shipment</u> (Table 1)

Note: A HMSR may be required. See Step 4 in Pre-Job Planning section. If sample is destined for an offsite laboratory, see Offsite Sample Shipment section.

1. Place evidence tape (signed and dated by sampler) on ice chest.

2. Have HPT survey and obtain dose rate on each ice chest.

3. If sample is from a designated and approved non-radioactive exempt facility area no radioactive survey and RSR are required for shipment to onsite facilities.

4. If radiation level is <.5 mr/hr sample is to be transported with routine RSR.

5. If off-normal conditions are found, such as: sample form is different than specified on SAF, pH <2 or >12.5, and/or organics. Contact Manager, Waste Sampling and Monitoring before transporting samples.

6. If radiation level is >.5 mr/hr sample must be transported by a non-routine RSR. Contact Transportation Logistics to prepare necessary RSR prior to sample movement from sampling site.

<u>Offsite Sample Shipment</u> (Table 2)

Notes: A HMSR may be required. See Step 4 in Pre-Job Planning section.

The special sample identified in Step 5 in the Pre-Job Planning section is required to establish radiological information for offsite shipments. This sample is transported to the 222-S Laboratory in its own proper shipping container and with a unique Chain-of-Custody.

1. Place evidence tape (signed and dated by sampler) on ice chest.

2. If sample is from a designated and approved non-radioactive area/exempt facility no radioactive survey or RSR are required for transport to 100 Area for shipping.

3. If sample is from other than a designated non-radioactive area, have an HPT survey and obtain contact dose rate (222-S sample and offsite samples) on each ice chest.

4. If radiation level is <0.5 mr/hr, samples is to be transported with routine RSR to 222-S.

5. If off-normal conditions are found, such as: sample form is different than specified on SAF, pH <2 or >12.5, and/or organics. Contact Manager, Waste Sampling and Monitoring before transporting samples.

6. If radiation level is >.5 mr/hr, samples must be transported by a non-routine RSR. Contact Transportation Logistics to prepare the necessary RSR prior to sample movement to 222-S.

7. Have manager assure that 222-S radiological information is available.

8. Contact Transportation Logistics to prepare necessary RSR for to sample shipment from 222-S.

TABLE 1

ONSITE SHIPPING REQUIREMENTS

	Non-Radiation	<.5 mr	>.5 mr
Non-Hazardous Material	Nothing	Routine RSR	Non-Routine RSR
Hazardous Material	HMSR	Non-Routine RSR	Non-Routine RSR

TABLE 2

OFFSITE SHIPPING REQUIREMENTS

	Non-Radiation	Radioactive
Non-Hazardous Material	Release	Offiste RSR
Hazardous Material	HMSR	HMSR Offsite RSR

INFORMATION RELEASE REQUEST

References: WHC-CM-3--

Complete for all Types of Release

Purpose

- [ ] Speech or Presentation
  - [ ] Full Paper
  - [ ] Summary
  - [ ] Abstract
  - [ ] Visual Aid
  (Check only one suffix)
- [ ] Speakers Bureau
- [ ] Poster Session
- [ ] Videotape
- [ ] Reference
- [x] Technical Report
- [ ] Thesis or Dissertation
- [ ] Manual
- [ ] Brochure/Flier
- [ ] Software/Database
- [ ] Controlled Document
- [ ] Other ______

New ID Number: WHC-SD-WM-PLN-036 Rev. 1

Existing ID Number (include revision, volume, etc.)

If previously cleared, list ID number.

Date Release Required: 4/29/92

Title: T-Plant Facility 216-T-1 Laboratory Wastewater Stream Sampling and Analysis Plan

Unclassified Category: UC-

Impact Level: 1[illegible]

Complete for Speech or Presentation

Title of Journal

Group or Society Sponsoring

Date(s) of Conference or Meeting

City/State

Will proceedings be published? [ ] Yes [ ] No

Will material be handed out? [ ] Yes [ ] No

Title of Conference or Meeting

CHECKLIST FOR SIGNATORIES

Review Required per WHC-CM-3-4	Yes	No	Reviewer Name (printed)	Signature	Date
Classification/Unclassified Controlled Nuclear Information	[ ]	[x]			
Patent - General Counsel	[x]	[ ]	B. D. Williamson	DM Nguyen for (per telecon)	4/29/9[illegible]
Legal - General Counsel	[x]	[ ]	B. D. Williamson	DM Nguyen for (per telecon)	4/29/9[illegible]
Applied Technology/Export Controlled Information or International Program	[ ]	[x]			
WHC Program	[x]	[ ]	D. M. Nguyen	DM Nguyen	4/29/92
Communications	[ ]	[x]			
DOE-RL Program	[x]	[ ]	R. S. Ollero	RS Ollero	4/29/9[illegible]
Publications Services	[x]	[ ]	M. R. Turner	For publications review in 4 ... [illegible]	4/30/9[illegible]
Other Program	[x]	[ ]	J. E. Rasmussen	J E Rasmussen	4/29/9[illegible]
References Available to Intended Audience	[x]	[ ]	R. E. Bolls	R E Bolls	4/28/92
Transmit to DOE-HQ/Office of Scientific and Technical Information	[ ]	[x]	J. E. Hyatt	Jeannette Hyatt Sampling & Mobile Labs	4/29/92

Information conforms to all applicable requirements. The above information is certified to be correct.

Author/Requestor (Printed/Signature) Date

R E Bolls 4/28/92

R. E. Bolls

Responsible Manager (Printed/Signature) Date

R D P

R. D. Pierce 4/28/92

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